REMARKS

In response to the Office Action dated October 12, 2001, claims 1 and 3 are amended and claims 13-19 are canceled. Claims 1-12 are now active in this application. No new matter has been added.

The indication that claim 11 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims, and if noted indefiniteness is appropriately addressed is acknowledged and appreciated.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claims 10, 11 and 17 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In support of this position, the Examiner maintains that "the logarithmic number" in claim 10 and once in claim 17 is unclear as "a logarithmic number" has not previously been recited. Claim 10 is further considered to be indefinite in that "the logarithmic number" is recited twice, but there is no distinction that they are different numbers.

The rejection is moot as to canceled claim 17, and claim 10 is amended to respectively recite "a first logarithmic number" and "a second logarithmic number". Therefore, it is respectfully urged that the rejection be withdrawn as to claims 10 and 11, as amended.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 102 AND § 103

Claims 1, 2 and 12 are rejected under 35 U.S.C. § 102(e) as being anticipated by Robinson.

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Robinson in view of Rosenthal.

Claims 4-8 and 13-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Robinson.

Claims 10-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Robinson in view of Anderson et al.

The rejection of claims 13-17 is moot as these claims are canceled.

In amended claim 1, the light emitter is adapted to emit light including light rays in a first wavelength range and light rays in a second wavelength range. In addition, the first electric signal generator and the second electric signal generator are adapted to generate signals corresponding to intensities concerning a light ray in the first wavelength range and a light ray in the second wavelength range, respectively, based on the light including the light rays in the first wavelength range and the second wavelength range.

In this arrangement, when the light emitter emits light for one time, four signals necessary for computation can be obtained.

On the other hand, Robinson discloses, in FIG. 35 and Col. 26, lines 29-49, an apparatus in which measurement is carried out a plurality of times by changing the wavelength to obtain data for computation.

Specifically, according to the present invention, measurement is completed when the light emitter emits light only once. This arrangement enables the time required for measurement to be shortened as compared with the case of emitting light a number of times as in Robinson. Furthermore, in the case of emitting light a number of times, as disclosed in Robinson, an object for measurement may be displaced during the

measurement, thereby causing a measurement error. The arrangement of the present invention, however, eliminates such a measurement error due to displacement of the object during measurement as the light emitter emits light only once.

Thus, independent claim 1 is patentable over Robinson as are claims 2-12, depending from claim 1.

In addition, claim 3 recites that the first light incident port and the second light incident port are arranged at a position inwardly of the light emerging port and at a position outwardly of the light emerging port, respectively. With this arrangement, the respective light incident ports receive light rays that have been emitted in the opposite directions from the light emerging port as well as light rays returning in different optical path lengths.

On the other hand, Robinson discloses (see FIGS. 32 and 35) that a plurality of concentrically-arranged light incident ports or light emerging ports are provided adjacent to each other.

Although Rosenthal discloses a measurement instrument provided with a detecting portion in the center thereof, this reference does not disclose a plurality of light incident ports or light emerging ports. More specifically, neither Robinson nor Rosenthal disclose or suggest the arrangement of claim 3 of the present invention in which the light incident port and the light emerging port are alternately concentrically arranged. Even if the arrangement of Robinson were modified based on the disclosure of Rosenthal, the present invention does not result. What does result from such modification is an arrangement where the position of the light incident port and the light emerging port is reversed to the arrangement of Robinson. Such modification of Robinson based on the

disclosure of Rosenthal does not result in the inventive arrangement (of the present invention) that the light incident port and the light emerging port are arranged alternately concentrically.

Further, alternately arranging the light incident port and the light emerging port enables the respective light incident ports to receive light rays that have been emitted in the opposite directions from the light emerging port, as well as light returning in different optical path lengths. This arrangement enables to detect light rays that have passed different sites on the light incident ports. However, neither Robinson nor Rosenthal disclose or remotely suggests such arrangement and the effect resulting therefrom.

Consequently, claim 3, depending from claim 1, is patentable over Robinson and Rosenthal, considered alone or in combination, for reasons in addition to the reasons why claim 1 is patentable over Robinson.

CONCLUSION

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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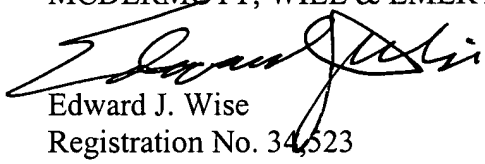

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VERSION WITH MARKINGS SHOWING CHANGES MADE

1. (AMENDED) A bilirubin concentration measuring apparatus, comprising:

a light emitter for emitting a light which includes a first luminous flux falling in a first wavelength range and a second luminous flux falling in a second wavelength range, their bilirubin absorption coefficients differing from each other;

a light emerging port for projecting the first and second luminous fluxes onto skin of a person;

a first light incident port for allowing the first and second luminous fluxes having been diffused in the skin to pass therethrough;

a second light incident port for allowing the first and second luminous fluxes having been diffused in the skin to pass therethrough, the second light incident port being spaced away from the light emerging port a different distance than the first light incident port;

a first electric signal generator for generating a first electric signal corresponding to an intensity of the first luminous flux passed through the first light incident port, and a second electric signal corresponding to an intensity of the second luminous flux passed through the first light incident port;

a second electric signal generator for generating a third electric signal corresponding to an intensity of the first luminous flux passed through the second light incident port, and a fourth electric signal corresponding to an intensity of the second luminous flux passed through the second light incident port; and

a calculator for calculating a bilirubin concentration based on the first to fourth electric signals.

3. (AMENDED) A bilirubin concentration measuring apparatus, comprising:

a light emitter for emitting a light which includes a first luminous flux falling in a first wavelength range and a second luminous flux falling in a second wavelength range, their bilirubin absorption coefficients differing from each other;

a light emerging port for projecting the first and second luminous fluxes onto skin of a person;

a first light incident port for allowing the first and second luminous fluxes having been diffused in the skin to pass therethrough;

a second light incident port for allowing the first and second luminous fluxes having been diffused in the skin to pass therethrough, the second light incident port being spaced away from the light emerging port a different distance than the first light incident port;

a first electric signal generator for generating a first electric signal corresponding to an intensity of the first luminous flux passed through the first light incident port, and a second electric signal corresponding to an intensity of the second luminous flux passed through the first light incident port;

a second electric signal generator for generating a third electric signal corresponding to an intensity of the first luminous flux passed through the second light incident port, and a fourth electric signal corresponding to an intensity of the second luminous flux passed through the second light incident port; and

a calculator for calculating a bilirubin concentration based on the first to fourth electric signals [An apparatus according to claim 1,] wherein:

the first light incident port has the form of a circle and is disposed in a middle of a light incident plane;

the light emerging port has the form of a ring and is disposed on an outside of the first light incident port; and

the second light incident port has the form of a ring and is disposed on an outside of the light emerging port.

10. (AMENDED) An apparatus according to claim 1, further comprising a memory for storing first to fourth constants corresponding to the first to fourth electric signals, respectively, wherein the calculator executes:

calculation of first to fourth products by multiplying the first to fourth electric signals by the first to fourth constants;

calculation of [the] a first logarithmic number of a quotient obtained by division of the second product by the first product;

calculation of [the] a second logarithmic number of a quotient obtained by division of the fourth product by the third product; and

calculation of a bilirubin concentration based on a difference between the calculated two logarithmic numbers.